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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,167	10/12/2001	Frederick Paul Benning	ROC920010111US1	1982

7590

06/14/2006

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EXAMINER
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AHMED, SHAMIM

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 06/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/976,167

Applicant(s)

BENNING ET AL.

Examiner

Shamim Ahmed

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-18,35 and 40-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-18,35 and 40-42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

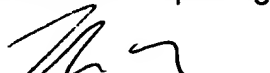
### DETAILED ACTION

1. In view of the appeal brief filed on 4/3/06, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below. The prosecution has been reopened to address the issues raised by applicant's arguments such as the applied prior art fails to teach the use of the claimed specific surfactants with the colloidal particles.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below: **NADINE G. NORTON**  
**SUPERVISORY PATENT EXAMINER** 

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1,4-6,8-10,17-18 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma et al (US 2003/0079416 A1).

Ma et al disclose a polishing composition comprising carrying fluid such as acids, colloidal particles, ferric nitrate, which resemble as the metal etchant and a surfactant of cationic or anionic (paragraphs 0047-0051, paragraphs 0053 and 0059-0061).

Ma et al disclose that the surfactants causes steric repulsion among the particles (paragraph 0060) but do not explicitly teach that the surfactants causes steric hindrance barrier between the substrate and the particles.

However, Ma et al teach that the abrasive particles may comprise silica, alumina, ceria and mixture thereof (paragraph 0068) and hence the surfactants causes steric repulsion among the particles (paragraph 0060).

Ma et al also teach that the composition is use to polish metal, barrier layer and dielectric material such as silicon oxide (abstract and paragraph 0033).

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Therefore, it would have been obvious to form similar steric repulsion or steric hindrance between the substrate and the particles because the substrate comprises dielectric material such as silicon oxide as taught by Ma et al.

As to claims 4-6 and 8, Ma et al teach that the pH of the polishing composition is in the range of 2 to about 4.8 (paragraph 0050) and preferably in the pH range of 4-10 (paragraph 0069).

As to claims 9-10, Ma et al teach that the nominal particle size is in the range of about 3 to 100 nm (paragraphs 0047 and 0070-0071).

As to claims 17-18, Ma et al teach that the surfactants may be cationic or anionic (paragraph 0060 at page 5).

5. Claims 1,3-6, 8-13,15,17-18 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartog et al (6,236,542) in view of Kramer et al (6,630,403).

As to claims 1,11-12 and 35, Hartog et al disclose a cleaning polish etch composition comprises a carrying fluid such acid, neutral or base solution and metal etchant such as aluminum nitrate or cerium sulfate or any other etchant depending on the substrate for etching the substrate and/or the attached slurry particles (col.4, lines 19-28, col.5, lines 60-col.6, lines 17).

Hartog et al fail to teach the composition comprises a surfactant that forms a steric hindrance barrier between the substrate and the colloidal particles.

However, Kramer et al disclose a polishing composition including silica abrasive and surfactant, wherein the surfactant forming particle barrier layer or flow modifiers to

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reduce roughening on the polished surface in order to reduce scratches and eventually cracking on the polished surface and the reduction of cracking decreases access of cleaning chemistry to underlying structures of the substrate (col.2, lines 1-5 and lines 53-67 and col.3, lines 13-21 and col.4, line 66-col.5, line 12 and col.6, lines 55-67).

Kramer et al do not explicitly teach that the surfactants form a steric hindrance barrier between the substrate and the colloidal particles but disclose that the surfactants are similar as the instant invention such cationic surfactants are derived from amine salt (col.5, lines 5-11) and expected to have similar effect.

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to combine Kramer et al's teaching of introducing a surfactant into Hartog et al's composition for reducing scratches and cracks on the surface during polishing as taught by Kramer et al.

As to claim 3, Hartog et al teach that the substrate is a silicate based glass disk (col.4, lines 12-25).

As to claims 4-6, Hartog et al teach that the colloidal particles are silica based and pH of the composition could be about 1.0 (col.7, lines 8-13).

As to claim 8, Hartog et al teach that the pH of the composition could be above 3.0, which reads on claimed pH 3.5 (col.5, lines 40-43).

As to claims 9-10, Hartog et al teach that the colloidal particles have a size in the range of 0.001-1  $\mu\text{m}$  (1-1000nm) (col.6, lines 25-29).

Hartog et al teach that the colloidal particles have a size in the range of 0.001-1  $\mu\text{m}$  (1-1000nm) (col.6, lines 25-29).

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As to claims 13,15 and 17-18, Kramer et al teach the use of surfactant of cationic (amines at col.5, lines 6-10), anionic or nonionic including amines and oxygen-containing compound (col.5, lines 40-44).

As to claim 35, modified Hartog et al teach the composition including the same surfactant as the instant invention and expected to have the same characteristic such as the surfactant adsorbed or precipitated onto the surface of the substrate or abrasive particles.

6. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartog et al (6,236,542) in view of Kramer et al (6,630,403) in view of Dirksen et al (6,872,328).

Modified Hartog et al discussed above in the paragraph 5 but fail to explicitly teach that the composition comprises cationic surfactant of quarternary amine and colloidal alumina having a pH of about 3.5-10.5 (claim 8) or a pH of about 7-12 (claim 7).

However, Dirksen et al disclose a composition comprises abrasive particles of silica or alumina (aluminum oxide) having a pH of about 7 or less for efficiently planarizing or polishing substrate including metal (col.1, lines 54-60, col.2, lines 9-38 and col.3, lines 64-68).

Dirksen et al also disclose the composition includes a liquid carrier along with abrasive particles to facilitate the application of the abrasives (col.3, lines 43-49) and

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additives of amine-containing compound of quarternary amines (col.4, lines 19-38), which reads on the claimed cationic quarternary amine surfactant for effective polishing.

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to combine Dirksen et al's teaching into modified Hartog et al's composition for efficient polishing of metal substrate as taught by Dirksen et al.

7. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hartog et al (6,236,542) in view of Kramer et al (6,630,403) in view of Aoki (6,423,148) as evidenced with Akhavan-tafti et al (5,686,258).

Modified Hartog et al discussed above in the paragraph 5 but fail to explicitly teach that the composition comprises cationic surfactant of polydentate.

However, in a process of metal polishing, Aoki teaches the use of a complexing agent of EDTA in polishing slurry for removing metal impurities (col.10, lines 3-14).

It is noted that Aoki's EDTA is an example of commonly used chelating agent polydentate cation as evidenced with Akhavan-tafti et al (see col.6, lines 4-6).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to combine Aoki's teaching into modified Hartog et al's composition for efficiently polishing the metal substrate without having metal impurities on the polished surface as taught by Aoki.



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8. Claims 14 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable Hartog et al (6,236,542) in view of Sahota et al (6,720,264) and further in view of Burton et al (6,083,838).

Hartog et al discuss in the paragraph 5 above but fail to teach the use of claimed surfactant.

However, Sahota et al teach the introduction of oxygen-containing compound (DMSiO-EO) that contain ethylene oxide and leads to a much greater adsorption onto silica surface resulting better result (col.10, lines 1-14 and lines 47-55).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to combine Sahota et al's teaching into Hartog et al's composition for increasing the polishing efficiency by introducing the improved surfactant as taught by Sahota et al.

As to claim 40, Modified Hartog et al may be do not teach the surfactant is ethylene oxide propylene oxide- block copolymer.

However, Burton et al disclose a CMP slurry composition containing abrasive and a surfactant is used to increase the polishing capability by increasing the viscosity of the slurry, wherein the surfactant is propylene oxide-ethylene oxide block copolymer (col.3, lines 62-65 and col.4, line 64-col.5, line 9).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to combine Burton et al's teaching into Hartog et al's composition for increasing the polishing efficiency by introducing the improved surfactant as taught by Burton et al.

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9. Claims 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartog et al (6,236,542) in view of Roberts (5,723,181).

Hartog et al discusses in the paragraph 5 above but fail to teach the introduction of specific surfactant having hydrophobic section that forms a steric hindrance barrier between the substrate and the colloidal particles (claim 41), wherein the surfactant is sodium octyl sulfate in the composition (claim 42).

However, Roberts teaches that surfactant such as sodium octyl sulfate is used in a colloidal silica composition for changing the surface chemistry and resulted surface is more susceptible to the surface processing (col.1, lines 49-60 and col.2, lines 46-53).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to combine Roberts's teaching into Hartog et al's composition for enhancing the polishing of the surface by changing the surface chemistry as taught by Roberts.

It is noted that the combined teaching of Hartog et al's surfactant is precipitated onto the surface and creating the steric hindrance as claimed because the surfactant is exactly same as the instant invention and expected to have the same property as the claimed one.

### ***Response to Arguments***

10. Applicant's arguments filed 4/3/06 have been fully considered but they are not persuasive. Applicants argue that Ma et al do not disclose a composition used for superfinishing a surface of disk substrate, wherein the disk substrate for use in a data storage device.

In response, examiner states that the argument is not persuasive because a composition is what it is but not what it does. It is also noted that the composition is capable of superfinishing the disk substrate, which is an intended use of the composition because it includes all the constituents as the instant invention.

Applicants point out that Ma et al teach organic polymer abrasive as first slurry and colloidal particle as second slurry in which surfactant is introduced not with the first slurry.

In response, examiner noted that Ma et al's first slurry also may include colloidal particles as abrasive (paragraph 0059) and additionally, both the first and second slurry are illustrated to be abrasive particles during polishing a substrate.

Applicants argues that Ma et al or Hartog et al or Kramer et al do not teach the texturing the disk substrate.

In response, examiner states that the argument is not persuasive because Hartog et al teach the use of colloidal particles size is 1-1000 nm, which overlaps the claimed range of 70-200 nm (see the rejection) as applicant acknowledged in the argument section that would have been accepted to have similar texturing in the polished surface as taught by Hartog et al and Ma et al (see paragraph 0071, at page 6).

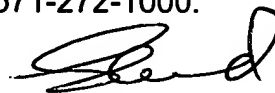
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (571) 272-1457. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G. Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Shamim Ahmed  
Primary Examiner  
Art Unit 1765

SA  
June 9, 2006